Appendix J
LCRS/Train 3 Treatment Contingency Plan

J1.0 Contingency Plan Overview

J1.1 Background

The disposal cell at the Weldon Spring Site currently (August 2004) generates approximately 200 gallons of leachate per day, and manganese concentrations in the leachate exceeds the permitted effluent limit. The LCRS sump capacity is approximately 11,000 gallons, or 45 days of storage at the current flow rate. The uranium activity is below the discharge goal stated in the NPDES permit. This leachate is currently being hauled to the Metropolitan Sewer District (MSD) via commercial hauler for disposal and treatment under an approval granted to DOE on December 21, 2001, by the MSD. DOE had originally expected to treat the leachate on-site and discharge the treated leachate through a dedicated pipeline to an NPDES permitted outfall at the Missouri River. However, when MSD approved disposal of the leachate at their facility, construction was suspended on the Train 3 treatment facility. A metal industrial building was already under construction, and the major equipment required for the treatment process had already been purchased. DOE decided to complete the building construction and store or surplus the process equipment that remained. This plan was prepared as a contingency for treating the leachate in the event that the primary leachate management option (i.e., hauling to the MSD treatment facility) was no longer available. The objective was to use as much of the existing equipment as possible in a configuration that would support a rapid start-up, if needed.

Prior t August 2004, the leachate was hauled to MSD without any pretreatment requirements. Beginning in September 2004, the Weldon Spring Site initiated a pretreatment process to reduce the uranium concentration in the leachate to below 30 μg/L. This was in order to comply with a new MSD requirement for the leachate to be below drinking water standards prior to acceptance. The treatment process included filtration and ion exchange. The process successfully reduces uranium to below the MSD acceptance criteria. The WSS anticipates pretreating the leachate until the uranium concentration falls below 30 μg/L.

J1.2 Current State

The LCRS Support Building is completed and operational. The building is heated, and roof-mounted ventilation fans are installed and operational. There is adequate electrical service to support all operational needs. No potable water is supplied to the building. The building currently houses electrical equipment used to support the LCRS operation, four fiberglass reinforced plastic (FRP) tanks (500, 4,500, 4,500, and 7,600 gallon), two ion exchange vessels, four cartridge filter housings, and miscellaneous related equipment. The tanks were anchored in their permanent locations during the building construction. The ion exchange vessels and filter cartridge housings were recovered from other treatment processes that were used at WSS and are in good condition. Ion exchange resin and filter cartridges are in the building. Two air-driven diaphragm pumps are in the building. There is no compressed air supply in the building.

The building was modified to facilitate haul truck loading of leachate by installing piping and a flowmeter that penetrates the south wall and is equipped with a quick disconnect fitting that is compatible with the leachate haulers' hoses. This piping connects the leachate influent piping located inside the building to the exterior of the building.

The building is used regularly by WSS staff to download instrument records from the instrument display cabinet in the building and for storage of supplies and equipment used for leachate sampling. Purge water generated from certain monitor wells is passed through granular activated carbon and stored in the 500-gallon FRP tank. The purge water is consolidated with the leachate and hauled to MSD for disposal as needed.

J1.3 Operational Philosophy

The original process was intended to be automated because it was planned to be a permanent activity. However, the current plan is a contingency and a less automated approach is appropriate. Leachate will be pumped from the sump and through the various processes using an air-driven diaphragm pump and a portable air compressor. The pump will be repositioned after each step of the process to convey the leachate to the next process. Heavy-duty rubber hoses with quick-disconnect fittings will be used for leachate transfer. These hoses are not currently on site and will have to be fabricated if the contingency plan is exercised. Manual addition of the dilute consumer-grade chlorine bleach to oxidize the manganese was in the original plan and remains unchanged. The ion exchange process equipment will not be used if uranium concentration is below the permit goal of 100 pCi/L.

J1.4 Process Overview

Leachate will be transferred to TK-100 via the air-driven pump. Commercially available household bleach (6 percent sodium hypochlorite by weight) will be added at a rate of 1.5 gallons bleach per 1,000 gallons leachate. TK-100 will be mixed for one hour using the air-driven pump connected in a loop. The TK-100 contents will be pumped with the air-driven pump through the cartridge filters for serial filtration through 10 micrometer (nominal) then 5 micrometer (nominal) cartridges to TK-300. The water will be sampled for the constituents described in the NPDES permit (MO-0107701) and discharged. If uranium concentration is above the permit goal of 100 pCi/L, anchoring, piping, and media loading will be required for the ion exchange system. Current uranium concentrations have been averaging approximately 50 pCi/L, and the manganese concentration has been decreasing (averaging approximately 4.5 mg/L) but is still above permit limit (0.5 mg/L) for discharge to the Missouri River. If the contingency plan is exercised after July 13, 2005, the expiration date of the current NPDES permit, it is anticipated that the new uranium drinking water standard of 20 µg/L (30 pCi/L) would be applicable and that the discharge goal would be revised to 10 times the drinking water standard (300 pCi/L), as were the discharge goals for the other pollutants identified in the permit.

J1.5 Process Start-Up

The equipment will require several actions prior to startup. Four heavy-duty rubber hoses with quick-disconnect fittings will require fabrication. The lengths of the hoses will be field determined. A portable compressed air supply capable of providing 50 cubic feet per minute at 50 pounds per square inch (psi) will be needed to operate the diaphragm pumps. The cartridge filters and ion exchange vessels (if required) must be field located and anchored, and the interconnecting piping must be completed in accordance with the drawings. Consumer grade bleach can be purchased at any supermarket. The piping used to load out the leachate haul trucks must be modified to provide a connection on the inside of the building.

J2.0 Train 3/LCRS Equipment Setup Procedure

The Train 3 Process equipment should be installed in accordance with the referenced drawings for WP-565A.

All major equipment items and supplies required to set up and operate the treatment process are, as of this writing, located in the Train 3 building, with the exception of the heavy-duty rubber hoses, compressed air supply, and miscellaneous piping materials and hardware that will be required for assembly.

Cartridge filter housings and ion exchange vessels will be loaded according to manufacturer recommendations.

If the uranium concentration exceeds the discharge goals, use of the ion exchange system will be necessary prior to discharge.

J2.1 Transfer of Leachate from LCRS Sump to TK-100

1. Align valves as follows (Caution: Open valves slowly to avoid equipment damage):

   V-102 Closed
   V-103 Closed
   V-106 Closed
   V-104 Closed
   V-105 Closed

2. Connect hose line 2”-INF-1006-R1 from the tee fitting QD to the P-100 suction QD.

3. Connect hose line 2”-INF-1002-R1 between the P-100 discharge QD and the T-100 fill line QD.

4. Connect the air supply to P-100.

5. Align valves as follows (Caution: Open valves slowly to avoid equipment damage):

   V-102 Open
   V-103 Closed
   V-106 Open
   V-104 Open
   V-105 Closed

6. Turn on compressed air supply to P-100 and adjust to 50 psi. Check hoses and pumps for leaks.

7. Verify flow and proper operation of P-100.

8. Fill TK-100 with 3,000 gallons of leachate (this will be approximately 8’ of leachate in TK-100 and will leave 4’ of freeboard). Use FI-1 or direct measurement of the height of liquid in TK-100 to determine the volume of leachate in TK-100.

9. Close V-106.

10. Approximately one minute after closing V-106, turn off compressed air supply.

11. Close V-104

12. Disconnect 2”-INF-1006-R1 from P-100 and cap end of hose. Use a drip pan to prevent spillage on floor.

J2.2 Manganese Treatment/Chemical Precipitation

1. Connect one end of 2”-REC-1005-R1 to TK-100 discharge nozzle and the other end to P-100.

2. Open V-104 and V-105.

3. Turn on compressed air supply and verify 50 psi output to P-100.

4. Verify recirculation flow in TK-100.

5. Add 4.5 gallons (1.5 gallons consumer grade bleach/1,000 gallons leachate) of bleach through the manhole (M1) located on top of TK-100.

6. Allow TK-100 contents to recirculate for one hour

NOTE: A bleach/chlorine odor may be observed in the building. This does not present any hazard.

7. Close V-105.

8. Approximately one minute after closing V-105, turn off compressed air supply to P-100.

9. Close V-104.

10. Disconnect 2”-INF-1002-R1. Use a drip pan to prevent spillage on floor.

J2.3 Filtration

1. Reposition P-100 closer to filter cartridge vessels. (It may be necessary to disconnect 2”-REC-1005-R1 in order to reposition P-100. If this is done, make sure 2”-REC-1005-R1 is reconnected after repositioning.)

2. Connect 2”-FIL-1004-R1 to P-100 and cartridge filter unit inlet QD.

3. Connect 2”-FEFF-2003-R1 to cartridge filter unit outlet and TK-300 QD.

4. Align valves as follows (Caution: Open valves slowly to avoid equipment damage):

V-105	Open	V-210	Closed	V-205	Closed	V-301	Open
V-201	Open	V-211	Closed	V-215	Open	V-302	Closed
V-202	Open	V-212	Open	V-217	Open		
V-207	Open	V-213	Open	V-216	Closed		
V-209	Open	V-214	Open	V-218	Closed		
V-204	Open	V-219	Open	V-220	Closed		
V-208	Closed	V-221	Open	V-222	Closed		
V-206	Open	V-203	Closed	V-223	Open		

5. Turn on compressed air supply to P-100.

6. Vent F-201, F-202, F-203, and F-204 by slowly opening V-203, V-205, V-216 and V-218, respectively.

7. Pump contents of TK-100 through the cartridge filter unit to TK-300.

8. When TK-100 is empty, close V-105.

9. Approximately one minute after closing V-105, turn off compressed air supply to P-100.

10. Close V-301.

NOTE: After final run, drain cartridge filters to building sump.

11. Disconnect 2”-REC-1005-R1 and 2”-FIL-1004-R1 from P-100 and cap ends of hose. Use a drip pan to prevent spillage on floor.

J2.4 Ion Exchange Treatment

NOTE: If ion exchange treatment is not required, go to Procedure J2.5.

1. Reposition P-100 between TK-300 and the ion exchange vessels (IX-401 and IX-402).

2. Connect 2”-IX-4001-R1 to suction side of P-100.

3. Connect 2”-IX-4002-R1 to discharge side of P-100 and ion exchange unit inlet QD.

4. Connect 2”-IX-4006-R1 to ion exchange outlet and TK-500 fill QD.

5. Align valves as follows (Caution: Open valves slowly to avoid equipment damage):

V-302	Open	V-409	Closed	V-403	Open
V-401	Open	V-407	Closed	V-404	Open
V-402	Open	V-408	Closed	V-411	Open
V-405	Closed	V-410	Closed	V-501	Closed
V-406	Closed				

6. Turn on compressed air supply to P-100.

7. When TK-300 is empty, close V-302.

8. Approximately one minute after closing V-302, turn off compressed air supply to P-100.

9. Close V-401, V-402, V-403, V-404 and V-411.

J2.5 Transfer Treated Leachate to the Missouri River 007 Outfall

1. Connect hose line 2”-EFF-5001-R1 between TK-500 discharge nozzle QD and P-500 Suction side QD. (Note: If the ion exchange system is not used, connect hose line 2”-IX-4001-R1 to P-500 suction QD instead of hose line 2”-EFF-5001-R1. Drain contents of TK-300 to Missouri River 007Outfall.)

2. Connect hose line 2”-EFF-5002-R1 between P-500 and effluent pipeline plant stub-out flange.

3. Connect compressed air supply to P-500.

4. Open V-501 and V-502.

5. Turn on compressed air supply to P-500.

6. When contents of TK-500 (or TK-300, if applicable) are empty close V-502 (or V-302, if TK-300 contents were emptied).

7. Approximately 5 minutes after closing V-502 (or V302, if appropriate), turn off air supply to P-500.

8. Drain and secure all equipment and hoses when complete.